

WEATHER CONDITIONS OVER THE NORTH ATLANTIC OCEAN DURING JANUARY, 1917.

The data presented are for January, 1917, and comparison and study of the same should be in connection with those appearing in the REVIEW for that month. Chart IX (XLVI-9) shows for January, 1917, the principal storm tracks, the averages of pressure, air temperature, and for the first time the water surface temperatures (green), also the prevailing direction of the wind at 7 a. m., 75th meridian time (Greenwich mean noon). Notes on the locations and courses of the more severe storms of the month are included in the following general summary.

PRESSURE.

The mean atmospheric pressure for the month was unusual in some respects, especially south of the 40th parallel, as there was no well defined North Atlantic or Azores HIGH, although the isobar of 30.1 inches inclosed a long, narrow area extending from Madeira Island to eastern Texas. The southern portion of a LOW of 29.58 inches, central near latitude 55°, longitude 47°, is shown on Chart IX, and a second depression of slight intensity extended over France, and the southeastern part of England. The gradients over that part of the Atlantic Ocean east of the 40th meridian, were somewhat less than usual, while over the western division they were slightly steeper.

On January 14 a vessel near latitude 44°, longitude 55°, recorded a barometric reading of 31.03 inches, which is one of the highest ever reported over the ocean. This record was confirmed by those from a number of other vessels in the vicinity, where readings varied from 30.96 inches to 30.99 inches. The following table gives for a number of selected 5-degree squares the average pressure for each of the three decades of the month, as well as the highest and lowest individual readings reported within the respective squares.

Pressure over the North Atlantic Ocean during January, 1917, by 5-degree squares.

Position of 5-degree squares.		Decade means.			Extremes.			
Latitude.	Longitude.	I.	II.	III. ^a	Highest.		Lowest.	
					Pressure.	Date.	Pressure.	Date.
60-65 N.	20-25 W.	29.83	29.90	29.88	30.52	Jan. 13	29.33	Jan. 16.
55-60 N.	5-10 E.	29.65	30.08	30.40	30.80	Jan. 20	29.42	Jan. 4, 7.
55-60 N.	35-40 W.	29.86	29.77	29.24	30.52	Jan. 13	29.00	Jan. 24.
55-60 N.	10-15 W.	29.84	29.98	30.00	30.40	Jan. 23	29.58	Jan. 3.
55-60 N.	0-5 E.	29.67	29.94	30.31	30.63	Jan. 20	29.30	Jan. 4, 11.
50-55 N.	55-60 W.	29.75	29.59	29.56	30.60	Jan. 14	28.95	Jan. 31.
50-55 N.	30-35 W.	29.99	29.83	29.31	30.52	Jan. 13	28.56	Jan. 24.
50-55 N.	0-5 W.	29.89	29.79	30.07	30.40	Jan. 20	29.44	Jan. 12.
45-50 N.	65-70 W.	29.77	29.95	30.01	30.60	Jan. 13	29.30	Jan. 6.
45-50 N.	50-55 W.	29.82	29.69	29.54	30.78	Jan. 14	28.76	Jan. 31.
45-50 N.	25-30 W.	30.21	29.95	29.42	30.48	Jan. 11	28.90	Jan. 24.
40-45 N.	55-60 W.	29.88	30.03	29.86	31.03	Jan. 14	29.20	Jan. 19.
40-45 N.	15-20 W.	30.39	29.94	29.66	30.53	Jan. 1	29.32	Jan. 27.
35-40 N.	75-80 W.	29.97	30.24	30.10	30.70	Jan. 15	29.60	Jan. 11.
35-40 N.	50-55 W.	29.86	30.16	29.97	30.77	Jan. 14	29.60	Jan. 19.
35-40 N.	35-40 W.	30.11	30.10	29.88	30.57	Jan. 12	29.70	Jan. 30.
35-40 N.	5-10 W.	30.22	29.88	29.81	30.37	Jan. 1, 2	29.27	Jan. 27.
30-35 N.	40-45 W.	30.03	30.16	30.03	30.52	Jan. 13	29.79	Jan. 30.
25-30 N.	95-100 W.	30.06	30.24	30.01	30.40	Jan. 17	29.76	Jan. 4.
20-25 N.	45-50 W.	30.06	30.19	30.10	30.27	Jan. 13	30.02	Jan. 5, 7, 8.
15-20 N.	85-90 W.	30.02	30.08	30.02	30.11	Jan. 16	30.00	Jan. 5, 11, 15.
15-20 N.	30-35 W.	30.06	30.09	30.03	30.23	Jan. 18	30.00	Jan. 15, 28.

^a Mean of last 11 days of the month.

The mean and extreme values presented in the above table are based on the daily pressures, determined by interpolation, of each square on the M. S. daily synoptic charts of the North Atlantic compiled by the Marine Section of the Weather Bureau.

GALES.

The number of gales reported during the month was below the normal over the entire ocean, with the exception of a small area immediately east of the Banks of Newfoundland, where they were somewhat more numerous than usual.

On January 1, a LOW of limited extent was central near latitude 44°, longitude 40°. The lowest barometric reading was 29.33 inches, and southwesterly gales of from 50 to 55 miles an hour were encountered by vessels a short distance south of the center. On the 2d and 3d the conditions over the entire ocean were featureless, with no disturbance of any consequence. On Chart III (XLV-3) "Tracks of Low Areas for January, 1917," a LOW (I on our Chart IX) is shown on the evening of January 1, near Edmonton, Alberta. This moved in a southeasterly direction with a uniform rate of translation, and on the evening of the 3d was about 150 miles east of New York. On the morning of the 4th, the center was near latitude 40°, longitude 64°, where the barometer read 29.44 inches, and moderate winds prevailed. The disturbance continued its easterly course, and on the 5th was central near latitude 37°, longitude 50°; it had increased in extent and diminished in intensity, the wind velocities remaining about the same as on the previous day. During the next 24 hours this area remained practically stationary, gradually filling in. On the 6th a LOW (II on Chart IX) was in the vicinity of Father Point, Quebec; the lowest barometric reading was 29.26 inches, and one vessel about 100 miles south of Halifax encountered a southerly gale of about 50 miles an hour. Low II moved rapidly on a due easterly course, and on the 7th, the center was a short distance east of St. Johns, N. F., the conditions of wind and weather having changed but little since the previous day. This disturbance then curved slightly toward the north, and on the 8th was central near latitude 51°, longitude 40°, moderate winds and fog prevailing between the 35th and 45th meridians. There was also on the 8th a LOW of marked intensity over the English Channel, the barometer readings at Calais and Dover being 28.87 inches. At the same time the Azores HIGH was unusually well developed, with the barometer at Ponta Delgada reading 30.41 inches. In consequence of the steep gradient between these areas strong northwesterly gales were prevalent off the coasts of France and Great Britain. During the next 24 hours the easterly drift of the LOW was slight, as on the 9th the center was apparently a short distance east of Calais. The barometer, however, had risen to 29.31 inches, and no reports of heavy winds were received. On the 10th and 11th a LOW surrounded the Canadian and New England coasts, moderate to strong gales prevailing on both days, and on the 11th two vessels as far south as the coast of Florida reported westerly winds of 40 miles an hour. On the 12th a LOW was central off the northern coast of Newfoundland, and a number of vessels between the 35th and 45th parallels, and the 60th meridian and the American coast, recorded westerly and northwesterly winds of from 30 to 64 miles an hour, the latter velocity being reported by a vessel about 200 miles east of Hatteras.

On the 14th there was a LOW over the greater part of Canada, while at the same time a HIGH with a crest of 31.03 inches was about 10 degrees east of Halifax. Northerly gales with hail prevailed in the easterly quadrants of this high area, between the 40th and 47th meridians where the barometer readings ranged from 30.31 to 30.66 inches. There also were winds of gale force between the 70th meridian and the American

coast, and the 41st and 37th parallels. On the 16th there was a disturbance apparently central not far from the south coast of Greenland, although its position could not be accurately located on account of lack of observations. In connection with this Low, strong gales with snow and hail swept a limited area between the 43d and 53d parallels, and the 35th and 55th meridians, with a maximum velocity of 75 miles an hour near latitude 45° longitude 45°. On the 17th the center of this Low was at latitude 53°, longitude 39°, heavy weather still prevailing in the southerly and southwesterly quadrants.

The disturbance moved but little during the next 24 hours, and on the 18th the weather conditions were about the same as on the previous day. On the 19th St. Johns, N. F., with a barometric reading of 28.94 inches, was the center of a well-developed Low, westerly winds of from 40 to 65 miles an hour blowing over the region between the 35th and 44th parallels and the 50th and 70th meridians. From the 20th to the 23d the center of the disturbance remained between the 50th and 55th parallels and the 35th and 45th meridians. Moderate to strong gales were encountered on all these dates within the southern quadrants, and on the 22d, the storm area had reached its greatest extent, winds of 50 miles an hour occurring between the 28th and 45th meridians, from the Azores on the south to the 50th parallel on the north. On the 24th the Low was near latitude 52°, longitude 32°, the lowest barometric reading being 28.60 inches; the winds had increased in force, and the greater part of the steamer lanes were swept with violent gales, accompanied by snow and hail.

By January 25 the conditions had moderated somewhat, although heavy winds still prevailed along the sailing routes, between the 30th and 45th meridians. From the 26th to the 29th there were a number of comparatively slight depressions distributed over the ocean, and gales of varying velocities were reported from many scattered localities. They were most severe and covered the largest area on the 26th, when a number of vessels northwest of the coast of Scotland, encountered southerly winds of from 40 to 75 miles an hour. There was also on the same day an extensive storm area in mid-ocean between the 40th and 55th meridians. On the 30th the most pronounced area of low pressure of the month was central near latitude 45°, longitude 37°, where the barometer reading was 28.60 inches. The gradients were unusually steep, and the cyclonic movement of the wind very marked, velocities of from 50 to 90 miles an hour being reported from a large area between the 35th and 52d parallels, and the 30th and 50th meridians. This Low moved in an easterly direction, decreasing in intensity, and on the 31st the center was near latitude 45°, longitude 23°, where the barometer read 29.55 inches. On the same day a second Low appeared about 200 miles northeast of St. Johns, N. F., and the greater part of this region between the two areas was swept by heavy gales, and snow was reported by a few vessels.

AIR TEMPERATURES.

The average temperature of the air during the month was considerably above the normal over the greater part

of the ocean; the departures ranged from 0 to +3 degrees in mid-ocean, from +6 to +9 degrees over the waters adjacent to the American coast and in the Gulf of Mexico, and from -1 to +4 along the European coast, while in the Northeast Trade Winds region they were either zero or slightly negative. In northern waters the average temperature for the first decade was above that of the last two; off the coast of Labrador the variation from day to day was comparatively large, and the extreme temperatures in that vicinity ranged from 15° on the 28th, to 36° on the 6th to the 9th, inclusive.

The following table gives the temperature departures for the month at a number of Canadian and United States Weather Bureau stations on the Atlantic and Gulf coasts.

	°F.		°F.
St. Johns, N. F.	-2.5	Norfolk, Va.	+2.4
Sydney, C. B. I.	-0.6	Hatteras, N. C.	+2.0
Halifax, N. S.	+0.6	Charleston, S. C.	+5.3
Eastport, Me.	+0.5	Key West, Fla.	+3.8
Portland, Me.	+0.4	Tampa, Fla.	+8.4
Boston, Mass.	+3.2	Mobile, Ala.	+7.4
Nantucket, Mass.	-0.7	New Orleans, La.	+6.8
Block Island, R. I.	+0.6	Galveston, Tex.	+3.9
New York, N. Y.	+2.2	Corpus Christi, Tex.	+4.8

WATER SURFACE TEMPERATURES.

In winter, the temperature of the water at the surface, is, as a rule, considerably above that of the air at the same place, while the fluctuations from day to day and departures from normal are both less. For the month under discussion the water temperatures were somewhat below the normal over practically the entire ocean. The greatest negative departure, about 4 degrees, occurred in the 5-degree square adjacent to the coasts of North and South Carolina. The greatest variation during the month was reported from the 5-degree square that includes St. Johns, N. F., where the water thermometer read 40° F. on the 8th, and 19° on the 28th.

FOG.

The number of days on which fog was reported was considerably less than usual over the northern division of the ocean, and in the vicinity of the Banks of Newfoundland, where the normal percentage is from 30 to 35, it was observed during January, 1917, on only 4 days or 14 per cent. It was reported on from 1 to 3 days along the steamer routes, and on 2 days in the vicinity of Nantucket Shoals, while the European coast was practically free of fog.

HAIL AND SNOW.

The most frequent occurrence of hail was in the 5-degree square between latitudes 45°—50°, longitudes 35°—40°, where it was reported on 8 days. It was not observed on more than one day in any square east of the 30th meridian, or along the American and European coasts.

Snow occurred less frequently than hail, over the ocean as a whole; the greatest number of days on which it was observed was 7, in the square between latitudes 40°—45°, longitudes 55°—60°.

Winds of 50 miles per hour (22.4 m./sec.) or over, during January, 1918.

Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.
		<i>Mis./hr.</i>				<i>Mis./hr.</i>				<i>Mis./hr.</i>				<i>Mis./hr.</i>	
Atlanta, Ga.....	11	60	sw.	Ellendale, N. Dak.				Mount Tamalpais,				Point Reyes Light,			
Do.....	15	54	w.	—Continued.				Cal.—Continued.				Cal.—Continued.			
Block Island, R. I.	4	50	nw.	Do.....	24	50	nw.	Do.....	30	66	nw.	Do.....	14	52	se.
Do.....	5	56	nw.	El Paso, Tex.....	9	56	w.	Nantucket, Mass..	12	54	s.	Do.....	18	52	nw.
Do.....	12	60	se.	Do.....	13	50	w.	Do.....	15	60	s.	Do.....	25	70	nw.
Do.....	15	58	w.	Erie, Pa.....	11	60	se.	New York, N. Y..	4	54	nw.	Do.....	26	55	nw.
Do.....	23	58	nw.	Do.....	12	65	se.	Do.....	8	60	nw.	Do.....	27	67	nw.
Buffalo, N. Y.....	12	88	w.	Galveston, Tex....	11	56	nw.	Do.....	10	58	nw.	Do.....	28	50	nw.
Do.....	13	72	sw.	Hatteras, N. C....	12	52	sw.	Do.....	12	84	se.	Do.....	29	60	nw.
Do.....	14	56	w.	Do.....	15	72	sw.	Do.....	13	54	w.	Do.....	30	50	nw.
Do.....	15	50	w.	Jacksonville, Fla..	11	59	sw.	Do.....	15	73	nw.	Port Huron, Mich.	12	52	sw.
Do.....	16	56	w.	Do.....	15	55	s.	Norfolk, Va.....	11	60	se.	Do.....	15	64	w.
Do.....	28	52	w.	Key West, Fla.....	3	50	nw.	Do.....	12	67	se.	Do.....	23	53	nw.
Do.....	29	56	w.	Lincoln, Nebr.....	23	50	nw.	Do.....	15	58	w.	Raleigh, N. C.....	15	52	w.
Burlington, Vt.....	12	56	se.	Mobile, Ala.....	11	57	sw.	North Head, Wash.	1	50	se.	Richmond, Va.....	12	60	sw.
Cape May, N. J.....	12	52	s.	Mount Tamalpais,				Do.....	3	64	se.	Rochester, N. Y....	11	60	se.
Charlotte, N. C.....	11	60	sw.	Cal.....	3	60	nw.	Do.....	4	50	s.	Do.....	12	65	se.
Do.....	12	56	sw.	Do.....	4	54	nw.	Do.....	13	60	se.	Do.....	28	54	se.
Cheyenne, Wyo.....	23	54	w.	Do.....	8	56	nw.	Do.....	17	72	se.	San Antonio, Tex..	10	52	n.
Do.....	24	61	w.	Do.....	9	52	n.	Do.....	24	56	nw.	Sandy Hook, N. J..	12	66	s.
Cleveland, Ohio....	12	52	sw.	Do.....	10	65	n.	Do.....	25	50	nw.	Do.....	15	64	w.
Columbia, S. C.....	11	68	sw.	Do.....	12	64	nw.	Pensacola, Fla.....	6	58	w.	Savannah, Ga.....	11	56	sw.
Del Rio, Tex.....	10	54	nw.	Do.....	14	54	s.	Do.....	11	59	sw.	Tatoosh Island,			
Detroit, Mich.....	12	66	sw.	Do.....	18	60	nw.	Do.....	14	58	s.	Wash.....	1	56	s.
Do.....	13	54	sw.	Do.....	20	54	n.	Pittsburgh, Pa.....	12	58	w.	Do.....	3	50	s.
Duluth, Minn.....	12	60	nw.	Do.....	25	55	n.	Point Reyes Light,				Toledo, Ohio.....	12	63	sw.
Eastport, Me.....	15	62	e.	Do.....	26	56	n.	Cal.....	8	58	nw.	Trenton, N. J.....	8	50	w.
Ellendale, N. Dak.	11	50	n.	Do.....	27	62	n.	Do.....	9	54	nw.	Do.....	12	64	s.
Do.....	23	58	nw.	Do.....	29	80	nw.	Do.....	11	53	nw.	Do.....	15	50	n. w.